



IMPROVING COGNITIVE HEALTH & BRAIN FUNCTION

By Dr. Zoltan P. Rona, M.D., M.Sc.
www.highlevelwellness.ca

“Will you still need me, will you still feed me, when I’m 64?”

- John Lennon and Paul McCartney, 1968 -

If you are a senior or close to being one, you have a one in eight chance of suffering from significant cognitive decline. By age 80 the chances are that one in two of you will suffer from Alzheimer's disease or some other form of dementia.

Conventional medicine has very little to offer for prevention and treatment of the aging brain. In fact, most of the drugs prescribed by conventional doctors for other conditions actually cause premature brain aging, memory loss and confusion.

CAUSES OF MENTAL DECLINE

You might say that prescription drugs are one of the major contributors to accelerated brain aging. Chief amongst these are the statin drugs for high cholesterol, fluoroquinolone antibiotics, prescription tranquilizers, antidepressants, and electroconvulsive shock therapy.

It was recently reported that the commonly used proton pump inhibitor class of drugs (PPIs) used for heartburn increase the risks of cognitive decline by 44%. Unfortunately, millions of people are prescribed these drugs daily in the USA and Canada. Concussions can also be the cause of cognitive decline.

Statin drugs used to lower cholesterol deplete the brain of the important antioxidant CoQ10 as well as numerous steroid hormones, including vitamin D. The longer you use statin drugs, the greater will be your cognitive decline. A few years ago, I reported on the dangers of these overprescribed cholesterol-lowering drugs ([find the article archived online at: http://vitalitymagazine.com/article/challenging-the-statin-drug-dogma/](http://vitalitymagazine.com/article/challenging-the-statin-drug-dogma/)).

Another major issue is the growing problem of mercury toxicity from dental fillings, industrial pollution, and fish of all types. Mercury and other toxic heavy metals play an increasingly large role in damaging the brain.

To rid the body of these toxins, consider using the far infrared sauna (which causes the release of toxins through sweating), cilantro (a culinary herb that pulls heavy metals out of the tissues), chlorella (a superfood that detoxifies the cells), bentonite clay (a substance that pulls heavy metals out of the body through the bowels and should be taken within hours of cilantro), and other detoxifying strategies regularly. Intravenous chelation therapy is yet another strategy that removes toxic heavy metals from the body.

Commonly prescribed drugs for Alzheimer's or dementia rarely benefit an aging brain and serve primarily to keep agitated patients with dementia quiet or muzzled. The good news is that evidence supports the use of many nutrient supplements that can enhance brain function and prevent brain tragedies in later life.

Following a healthy organic diet and lifestyle while controlling stress can go a long way towards preventing brain damage. This includes avoiding gluten-containing grains and other personal food allergens, as well as sugar (including high fructose corn syrup) and refined

carbohydrates, while getting plenty of essential fatty acids in daily meals.

According to neurologist, Dr. David Perlmutter, author of “Grain Brain”, the main culprits responsible for Alzheimer's Disease are excessive sugar and genetically engineered grain (gluten) consumption. Not only are grains and refined carbohydrates associated with the obesity epidemic but they may also be one of the chief causes of brain aging.

Aside from a healthy diet and lifestyle, there are key supplements that virtually anyone can use to help enhance brain function and stave off the neurological problems of aging. Here are my top favourites based on the most recent studies and my clinical experience:

BEST BRAIN ENHANCING SUPPLEMENTS

1. OMEGA-3 FATTY ACIDS – 4000 mg (combined DHA and EPA) daily. Some food sources include free-range eggs and wild Pacific salmon. Omega-3 fats prevent brain cell damage and lower the risk of Alzheimer's primarily by controlling chronic inflammation.

2. MAGNESIUM-L-THREONATE – 400 to 800 mg daily. L-threonine is an essential amino acid found in high amounts in animal protein foods. Though it's also found in many plant sources, strict vegans can become deficient in L-threonine if their food choices are inadequate in protein. So too can those become who suffer from digestive challenges that prevent them from assimilating this amino acid. The best vegan sources appear to be leafy greens and whole grains.

Deficiency of L-threonine can lead to a fatty liver, digestive problems of many kinds, and emotional agitation. Although there is scant evidence for the clinical uses of this amino acid, holistic practitioners have used it in high doses to treat numerous psychiatric and neurological conditions that include amyotrophic lateral sclerosis (ALS), multiple sclerosis (MS), and muscle spasms associated with spinal cord injuries.

Fortunately, L-threonine is considered to be safe at even very high doses (over 5000 mg) taken for years at a time. Occasionally, L-threonine can cause some mild stomach upsets in sensitive individuals.

It is estimated that at least one half of all aging brains are magnesium deficient. Magnesium deficiency can affect the brain by causing symptoms such as apathy, anxiety, depression, chronic pain, psychoses, and memory loss. An insufficient amount of magnesium slows brain recovery from

trauma and post-traumatic stress disorder. Deficiency accelerates brain cell aging.

Researchers at Massachusetts Institute of Technology (MIT) have recently determined that magnesium plays a vital role in protecting the aging brain's structure and function. The problem was that conventional nutritional supplements do not deliver enough magnesium to the brain. Even intravenous magnesium delivers only small amounts of this vital mineral to the brain. The good news is that magnesium L-threonate not only absorbs very well from the GI tract but is also able to concentrate in high levels in the brain.

Magnesium L-threonate has been found to help repair damaged synapses. These are the spaces between two nerves that allow for information transmission from one nerve to the other through chemical messengers known as neurotransmitters. If synapses are damaged, information cannot be transmitted, hence memory and other nerve functions are interrupted. This is one of the mechanisms by which memory loss occurs in Alzheimer's disease and other types of brain disease. Alzheimer's disease is now the sixth leading cause of death in the U.S. and Canada. With our rapidly aging population, the destruction of synapses is going to be occurring at an increasingly rapid rate. The MIT study observed that regular consumption of magnesium L-threonate improved short-term memory loss by 18%, and long-term memory loss by 100%. Learning, cognitive performance, sleep quality, and memory can be improved by this rebuilding of damaged synapses. No other form of magnesium was able to duplicate these results, mainly because concentrations could never be created in high enough doses for any benefits to be achieved.

Admittedly, rat studies are not conclusive proof that magnesium L-threonate is the answer to Alzheimer's disease and dementia, but human studies are currently being conducted that could provide the necessary evidence for the broad scale use of this new supplement.

Although this has not yet been established either, the dose of magnesium needed to be transported by L-threonine is approximately 600 mg daily. The amount of L-threonine needed to do that would be about 1500 mg daily. Higher or lower doses could be used depending on stomach and bowel tolerance.

3. CURCUMIN – 1000 to 2000 mg daily. This powerful antioxidant extract from the spice turmeric is one of the most powerful natural brain protecting substances ever documented. Known as a potent anti-inflammatory for the whole body, curcumin boosts overall cognitive function and has recently been shown to be an effective antidepressant. Make sure the brand of curcumin you buy is either the natural BCM-95 type or the Longvida type (this should be specified on the label) due to its very high absorption and bioavailability. Some other brands use synthetic curcumin derived from petrochemicals, which are poor copies of natural curcumin and do not have the same well-researched and documented benefits.

4. VITAMIN D – 5000 to 10,000 IU daily. I mentioned in my book on vitamin D that receptors do exist in the brain for this hormone-like vitamin. Vitamin D is anti-inflammatory, and the evidence is clear that vitamin D levels are tied intimately to optimal brain function. It helps nourish brain glial cells that help damaged neurons. Vitamin D deficiency increases the risk of abnormal mood, memory and behaviour problems. Unfortunately, it is still ignored as an important brain booster by most of the conventional medicine world.

5. VITAMIN B 3 (NON-FLUSH INOSITOL HEXANIACINATE) 50 – 100 mg daily. It has long been known that supplemental vitamin B3 has powerful cognitive benefits. Natural health care professionals have recommended its use for decades to treat a long list of mental health concerns that include ADHD, memory loss, Alzheimer's disease, organic brain syndrome, alcohol and other addiction problems as well as schizophrenia, anxiety and panic attacks.

B3 (inositol hexaniacinate) is recommended for circulatory problems and lowering triglycerides and cholesterol. Niacinamide does not work in this fashion and is more applicable to anxiety, nervousness and irritability. Niacinamide is effective treatment for anxiety, insomnia, depression and other nervous system problems commonly seen in

people who suffer from hypoglycemia and/or diabetes. Dementia, irritability, headaches, mental confusion, attention deficit disorder, hallucinations, amnesia, certain forms of schizophrenia and severe depression can all be signs or symptoms of B3 deficiency.

Adverse Effects and Toxicity: hepatitis has been observed with the time released form of niacin; Inositol hexa-nicotinate (contains 6 molecules of niacin and 1 molecule of inositol) does not cause flushing or hepatitis.

Use Caution when taking more than 1000 mg. of niacin per day as it may elevate liver enzymes, which should be monitored during niacin therapy – if elevated, cut back on dosage.

Nausea is first sign of toxicity with both niacin and niacinamide. Flushing occurs with niacin, so it's best taken with food. Other adverse effects of high dose niacin are gastritis, elevated uric acid levels and reactivated peptic ulcers, the latter of which can be prevented by taking L-glutamine (4000 mg. with each dose) to repair any gastrointestinal damage.

6. VITAMIN B6 (PYRIDOXINE) – (100 – 1000 mg. daily) is clinically effective in practically all anxiety and depression related psychiatric illnesses including anorexia nervosa, attention deficit disorder, autism, bipolar disorder, PMS, chronic fatigue syndrome, fibromyalgia, hyperactivity and dementia. Caution should be taken as some reports of peripheral neuropathy (numbness, tingling, loss of sensation) have been reported with large doses of vitamin B6. This can be reversed by either lowering the dose of B6 or increasing relative doses of the other B-complex vitamins.

7. FOLIC ACID – 500 – 1000 mcg daily has been shown to improve cognitive function in numerous studies. Combining it with other B complex vitamins will enhance its beneficial effects.

8. VITAMIN B12 – 1000 - 5000 mcg methylcobalamin daily dissolved under the tongue. It's long been known that vitamin B12 injections and sublingually dissolved oral supplements will boost mood, energy and sharpen thinking in general. There is now good evidence from neurology journals that regular vitamin B12 consumption can reduce the risk of Alzheimer's. Of course, if you take high doses of vitamin B12, it's important to take a B complex along with the B12 in order to prevent a relative B vitamin deficiency.

9. COCONUT OIL – 20 grams daily of MCT (medium chain triglycerides) is a type of healthy fat that nourishes the brain and has reportedly reversed Alzheimer's symptoms in some studies (20 grams = 4 tsp; if your skin gets too oily, cut back on the intake). Coconut oil contains 66% MCT which contain ketone bodies (ketoacids) that actually both nourish and regenerate diseased brain cells. Aside from improving Alzheimer's, MCT has a potential in the treatment of Parkinson's, MS and ALS.

10. LITHIUM OROTATE – 10 to 20 mg daily. High doses of the mineral salt lithium (1200 – 1500 mg daily) are often used to treat bipolar disease (manic-depressive illness) but few people realize that low dose lithium can do wonders for brain function at virtually any age. Low dose lithium enhances nerve cell DNA replication. In actual studies, shrunken brains as seen on CAT scans and MRIs in patients suffering from dementia or Alzheimer's can be grown back over time to their original size. Lithium prevents damage to the brain by toxic molecules (heavy metals, drugs, pollutants, etc.) and normal brain erosion occurring over time. In other words, it prevents typical brain aging. Lithium prohibits beta-amyloid secretion, a substance found to be associated with Alzheimer's. Lithium also protects the brain from damage by aluminum, another purported cause of dementia and Alzheimer's.

11. COENZYME Q10 – 600 to 1200 mg daily. Best known for its benefits for cardiovascular disease and cancer treatment, CoQ10 may slow down and help prevent dementia and Alzheimer's. Recent studies do show enhancement of brain function after using high doses of CoQ10. CoQ10 has also been reported to help symptoms of Parkinson's disease, skin aging as well as periodontal disease.

12. PHOSPHATIDYLSERINE (PS) – 300 mg or more daily. This is a natural substance used by the brain to basically improve communication between neurons. It has been used effectively for any type of age related mental

functioning decline as well as for Alzheimer's, ADHD, depression and for the improvement of athletic performance. Phosphatidyl choline (aka lecithin) is a similar but weaker version of PS, and one needs at least 24 grams of the stuff daily to accomplish the same benefits.

13. GINKGO BILOBA EXTRACT – 120 mg daily of the standardized extract. One of my sons was fond of saying “no ginkgo, no thinko,” and I thinko he may have been right! This extract from the ancient ginkgo tree has been shown to increase blood flow to the brain and can be used to both prevent and reduce the progression of Alzheimer's.

14. L-THEANINE – 50 – 1000 mg daily. A good night's sleep is essential for optimal cognitive function. Green tea, often recommended for its anti-cancer, anti-oxidant, and other health-promoting effects contains caffeine. Why then does it not cause insomnia? The answer lays in its content of a lesser-known amino acid called L-theanine, which renders the caffeine in green tea harmless. L-theanine promotes mental and physical relaxation and decreases stress and anxiety, without inducing drowsiness. L-theanine increases alpha waves, which are present in an awake, relaxed state. To achieve such results, one must drink about 8 cups of green tea daily or supplement with L-theanine capsules.

Unlike other anti-stress botanicals, theanine does not make subjects drowsy or sleepy the next day. L-theanine does not produce theta

waves in the brain, which occur in a drowsy state. Based on the results of clinical studies, it has been established that L-theanine is effective in single doses in the range of 50-200 mg. It is suggested that subjects with higher levels of anxiety take a dose at the higher end of the effective range (250 – 1000 mg) for best results.

While not directly causing sleep, L-theanine helps anyone with a sleep disorder in two ways: 1) by reducing anxiety, and 2) boosting the brain's levels of GABA (gamma amino butyric acid), an inhibitory neurotransmitter that has anti-anxiety effects. Of course, one could also supplement the amino acid GABA in high doses (1000 – 5000 mgs) before bedtime to induce sleep. A good night's sleep helps cognitive function.

15. ASHWAGANDHA – 125 – 250 mg daily. This is an adaptogenic herb that has multiple benefits for stress, energy, memory and cognitive enhancement. It has a long history of safe and effective use without significant side effects.

16. VINPOCETINE – 5-10 mg. daily. This is an extract of the periwinkle plant used in Japan and Europe since the 1970s for cerebrovascular diseases (strokes, atherosclerosis, vascular dementia). It basically works by improving brain blood flow thus enhancing memory and cognitive function.

IN SUMMARY

Despite what conventional medical authorities will tell you, evidence suggests that the brain can change for the better with the use of natural remedies. Brain injury and degeneration is NOT permanent and you don't need ANY drug to fix the problem. It takes years, and not weeks or months, to see the beneficial effects with the natural approach because the brain takes a much longer time to heal than any other organ.

Aside from these top natural remedies, let's also be aware of the fact that severe imbalances in various hormones (Human Growth Hormone

(HGH), estrogen, progesterone, testosterone, DHEA, cortisol, insulin, thyroid, pituitary and several others) can have profound effects on brain aging. So can chronic stress, your personal genetics or family history, and the amount of time you exercise and have restorative sleep. Further, all antioxidant supplements and herbal remedies that control inflammation will work to prevent brain aging. For all these and other brain aging concerns, see your natural health care practitioner.

REFERENCES

David Perlmutter, MD. Grain Brain. Little, Brown and Co. New York:September 2013

U.S. study looks into the benefits of coconut oil on patients with Alzheimer's: <http://www.ctvnews.ca/health/health-headlines/u-s-study-looks-into-the-benefits-of-coconut-oil-on-patients-with-alzheimer-s-1.1491406>

Stress and Alzheimer's: <http://articles.mercola.com/sites/articles/archive/2013/10/10/stress-alzheimers-disease>.

Fluoroquinolone antibiotics: <http://articles.mercola.com/sites/articles/archive/2012/10/20/fluoroquinolones-side-effects.aspx>

Curcumin. Biochem Pharmacol. 2005 Sep 1; 70(5): 700-13

A Natural Alternative to Antidepressants, Curcumin BCM95: <http://www.foxnews.com/health/2013/10/09/natural-alternative-to-antidepressants/>

Synthetic curcumin: <http://www.nutraingredients-usa.com/Suppliers2/EuroPharma-to-launch-probe-into-synthetic-vs-natural-curcumin>

Rona, Zoltan P. Vitamin D, The Sunshine Vitamin. Tennessee, USA: Alive Books, 2010 : <http://www.amazon.com/Vitamin-D-Sunshine-Zoltan-Rona/dp/0920470823>

Vinpocetine Cognitive Benefits: <http://www.lifeextension.com/magazine/2015/2/block-the-vascular-origins-of-cognitive-decline/page-01>

Vitamin B12: <http://www.ncbi.nlm.nih.gov/pubmed/20956785>

Coconut oil and Alzheimer's: <http://articles.mercola.com/sites/articles/archive/2010/12/13/can-this-natural-food-cure-or-prevent-alzheimers.aspx>

Lithium, the misunderstood mineral: <http://tahoclinicblog.com/lithium-the-misunderstood-mineral-part-1/>

Coenzyme Q10: http://www.mayoclinic.com/health/coenzyme-q10/NS_patient-coenzymeq10/DSECTION=evidence

CoQ10 may protect against Alzheimer's: <http://www.nutraingredients.com/Research/CoQ10-may-protect-against-Alzheimer-s>

Phosphatidylserine: <http://www.webmd.com/vitamins-supplements/ingredientmono-992-PHOSPHATIDYLSERINE.aspx?activeIngredientId=992&activeIngredientName=PHOSPHATIDYLSERINE>

Ginkgo biloba extract: <http://www.drweil.com/drw/u/ART03064/Alzheimers-Disease.html>

Gaby, A.R., M.D., Wright, J.V., M.D.; Nutritional Therapy in Medical Practice, Reference Manual and Study Guide 2000 Edition; Wright/Gaby Seminars; Kent, WA; 2000.

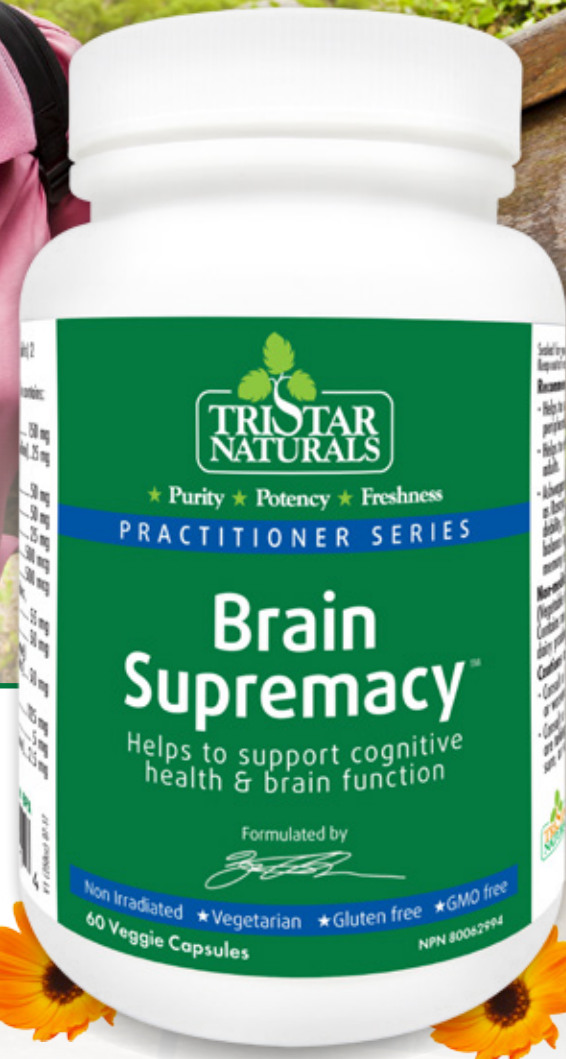
Levine, J. Controlled trials of inositol in psychiatry Eur Neuropsychopharmacol, 1997 May

Niacin Cognitive Benefits: <https://supplementpolice.com/niacinamide-benefits-review/>

Folic acid for cognitive decline: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5120319/>

Ashwagandha Cognitive benefits: <http://articles.mercola.com/sites/articles/archive/2017/05/11/ashwagandha-improves-memory-cognitive-function.aspx>

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